



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/890,550	01/14/2002	Kazutaka Majima	2000-22	4691

7590 11/27/2002

J Rodman Steele Jr
Akerman Senterfitt & Eidson
Post Office PO Box 3188
West Palm Beach, FL 33402-3188

EXAMINER

VO, HAI

ART UNIT	PAPER NUMBER
----------	--------------

1771

DATE MAILED: 11/27/2002

//

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/890,550

Applicant(s)

MAJIMA ET AL.

Examiner

Hai Vo

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-27, 29-40 and 43-46 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 20-27, 29-40 and 43-46 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Election/Restrictions

1. Applicant's election of Group I, claims 20-27, 29-40 and 43-46 in Paper No. 10 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 20, 22, 24, and 26 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 11-217268. The page numbers referred to below correspond to those of the English translation of the

Japanese Patent Application of JP 11-217268. JP'268 teaches a porous silicon carbide sintered compact having a silicon carbide crystal average grain diameter of 20 microns or greater, a thermal conductivity of 100-300 W/mK (abstract). JP'268 is silent as to porosity of the silicon carbide sinter. However, the grain diameter dictates the porosity and grain diameter disclosed by JP'268 is anticipatory, it is the examiner's position that the porosity would be inherently present within the range claimed by the claims. JP'268 anticipates or strongly suggests the claimed subject matter.

With regard to claims 22 and 26, JP'268 does not specially disclose the sinter forming a part of a wafer grinding apparatus. However, it has been held that a recitation with respect to the manner in which a claimed porous silicon carbide sinter is intended to be employed does not differentiate the claimed porous silicon carbide sinter from a prior art silicon carbide sintered compact satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

5. Claims 20, 22, 24, and 26 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP-11-320394. The page numbers referred to below correspond to those of the English translation of the Japanese Patent Application of JP11-320394. JP'394 teaches a wafer holding table comprising a wafer holding plate made of a porous silicon carbide sintered compact having a density of 3.1 g/cm³ which is closed to the density of the claimed silicon carbide crystal (3.0 g/cm³, page 44, line 27 of the specification), and a thermal conductivity of 170 W/mK (abstract, page 7, [0062]). JP'394 is silent as to the grain

Art Unit: 1771

diameter and the porosity of the silicon carbide crystal. However, since the thermal conductivity is directly proportional to the grain diameter (see Applicant's specification, page 11, lines 25 et seq.) and density dictates the porosity of the crystal, it is the examiner's position that the grain diameter and the porosity would be inherently present. Note In re Best 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made under 35 USC 102. JP'394 anticipates or strongly suggests the claimed subject matter.

6. Claims 20, 22, 24 and 26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP-07-033547. The page numbers referred to below correspond to those of the English translation of the Japanese Patent Application of JP 07-033547. JP'547 teaches a porous silicon carbide sintered compact having a porosity of 29% and a thermal conductivity of 190 W/mK (example 2, table 1). JP'547 is silent as to the grain diameter of the silicon carbide crystal. However, since the thermal conductivity is directly proportional to the grain diameter (see Applicant's specification, page 11, lines 25 et seq.), it is the examiner's position that the grain diameter would be inherently present. Note In re Best 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made under 35 USC 102. JP'547 anticipates or strongly suggests the claimed subject matter.

With regard to claims 22 and 26, JP'547 does not specially disclose the sinter forming a part of a wafer grinding apparatus. However, it has been held that a

recitation with respect to the manner in which a claimed porous silicon carbide sinter is intended to be employed does not differentiate the claimed porous silicon carbide sinter from a prior art silicon carbide sintered compact satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

7. Claims 20, 22, 24, and 26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Alliegro et al (US 3,951,578). Alliegro discloses a semiconductor furnace component comprising 50% by weight of fine SiC powder having a particle size of 0.1 to 8 microns, 50% by weight of rough SiC powder having a particle size of 30 to 170 microns (column 3, lines 1-5) and the sintered SiC is impregnated with silicon metal in an amount of 5 to 30% by weight (column 4, lines 63-65). Alliegro is using the same materials having the same concentrations to form a SiC sinter as Applicants, 50% by weight of fine SiC powder, and 50% by weight of rough SiC powder, both types of powders having the particle size ranges overlapping with claimed ranges. Further, the particle size of the powder does play a key role in attaining the grain size, porosity, and thermal conductivity of the SiC crystal (see pages 15-16 of the specification). Therefore, it is the examiner's position that the grain size, porosity and thermal conductivity would be inherently present. Note In re Best 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made under 35 USC 102. Alliegro anticipates or strongly suggests the claimed subject matter.

With regard to claims 22 and 26, Alliegro does not specially disclose the sinter forming a part of a wafer grinding apparatus. However, it has been held that a recitation with respect to the manner in which a claimed porous silicon carbide sinter is intended to be employed does not differentiate the claimed porous silicon carbide sinter from a prior art diffusion furnace component satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

8. Claims 29, 31, 33, 35, 37, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP-11-320394. JP'394 teaches every limitation of the claim (see discussion of 102/103 rejections in the paragraph no. 5 above) and further discloses the wafer maintenance plate containing 0.5 to 10 % by weight of aluminum (page 1, claim 4). However, such a variable would have been recognized by one skilled in the art to increase the strength of the sintered silicon carbide. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the aluminum with the amount instantly claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.
9. Claims 23, 27, 34 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP-11-320394, as applied to claims 20, 24, 29 and 35 in view of Jimbo et al (US 6,475,068). JP'394 is silent as to the fluid passage formed in the bonding interface of the base material. Jimbo teaches the wafer holding plate **6** provided with the groove pattern **10** on the wafer adhering surface 6a. The groove pattern **10** functions as an

Art Unit: 1771

anchor that causes the wax 8 to adhere the plate 6 (column 4, lines 53-56, and figures 1 and 3). The groove pattern disclosed by Jimbo is analogous to the fluid passage of the claimed invention. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the groove pattern on the wafer adhering surface of the wafer holding plate motivated by the desire to prevent various sizes of the semiconductor wafers from falling off from the wafer holding plate after the wafers are ground (Jimbo, column 4, lines 60-63).

*The claims do not require the bonded base materials are joined to each other by the fluid passage. The examiner suggests that Applicants need to be more specific about the structure of the base materials and the fluid passage in the table to overcome the prior art rejections, i.e., the table comprising a plurality of bonded base materials and they are bonded to each other by a fluid passage.

10. Claims 21, 25, 29, 30, 32, 33, 35, 36, 38, and 39 are rejected under 35 U.S.C.

103(a) as being unpatentable over Alliegro et al (US 3,951,578). The claimed range of the particle size overlaps with the range disclosed by Alliegro. However, such a variable would have been recognized by one skilled in the art to provide sufficient continuous porosity to permit complete impregnation of the SiC matrix with silicon metal. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the SiC powders having particle sizes instantly claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the

optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

The claimed amount range of the silicon metal overlaps with the amount range disclosed by Alliegro. However, such a variable would have been recognized by one skilled in the art to provide the complete impregnation of the SiC matrix with silicon metal. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the silicon metal with the amount instantly claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

11. Claims 43-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jimbo et al (US 6,475,068) in view of Tsukada (US 4,846,673). Jimbo teaches the wafer grinder comprising a plurality of the holding plates **6**, each provided with the groove pattern **10** on the wafer adhering surface 6a. The groove pattern **10** functions as an anchor that causes the wax **8** to adhere the plate **6** (column 4, lines 53-56, and figures 1-3). Jimbo teaches the plate formed of ceramic metal composite (column 3, lines 57-60). The groove pattern disclosed by Jimbo is analogous to the fluid passage of the claimed invention. Jimbo is silent as to the impregnating of the open pores of SiC sinter with silicon and the silicon coating layer of the SiC sinter. Tsukada teaches the inside of the porous sintered SiC being filled with silicon (abstract) and further the porous sintered SiC coated with silicon (column 9, lines 50-54). It would have been obvious to one having ordinary skill in the art at the time the

invention was made to impregnate the porous wafer holding plate with silicon and further apply the coating of silicon on the wafer holding plate motivated by the desire to provide the wafer holding plate having gas impermeability (Tsukada, column 9, line 54).

*The claims do not require the bonded base materials are joined to each other by the fluid passage. The examiner suggests that Applicants need to be more specific about the structure of the base materials and the fluid passage in the table to overcome the prior art rejections, i.e., the table comprising a plurality of bonded base materials and they are bonded to each other by a fluid passage.

With regard to claim 44, Tsukada discloses the inside of the sintered body being filled with silicon in an amount of 45 to 140 parts per weight based on 100 parts per weight of the silicon carbide (abstract). The claimed amount range of the silicon metal overlaps with the amount range disclosed by Tsukada. However, such a variable would have been recognized by one skilled in the art to provide the complete impregnation of the SiC matrix with silicon metal. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the silicon metal with the amount instantly claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

With regard to claim 45, since the sintered silicon carbide body of Jimbo has the same density and the thermal conductivity as the porous body of the present

Art Unit: 1771

invention, it is the examiner's position that the amount and the particle size of the silicon carbide crystal would be inherently present.

With regard to claim 46, none of the cited art discloses or suggests the thickness of the silicon bonding layer. Thus, the skilled artisan must rely on his own knowledge. It would be obvious to one of ordinary skill in the art to employ as little of the bonding layer as possible in order to reduce cost. Thus, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the silicon bonding layer with the thickness instantly claimed since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involved only routine skill in the art. *In re Aller*, 105 USPQ 233.

12. Claims 43 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 92/10441 in view of Bailey et al (US 3,859,399). WO'441 teaches a composite monolithic lap for use in grinding or polishing of ceramic materials comprising a ceramic metal composite **10** formed by impregnating metal silicon in opened bores of a porous body made of silicon containing ceramic (page 14, lines 9-32), a bonding layer formed from the metal silicon to bond the ceramic metal composite **10** (page 14, lines 10-17), and a fluid passage **22** formed in a bonding interface of the ceramic metal composite (page 12, lines 30-35) and a ceramic workpiece **20** (figures 2-4). WO'411 is silent as to workpiece being formed from the ceramic metal composite having the metal silicon filled in the pores of the sintered body. Bailey teaches the inside of the porous sintered SiC being filled with silicon (example 1). It would have

Art Unit: 1771

been obvious to one having ordinary skill in the art at the time the invention was made to employ the silicon metal to fill the pores of the sintered body of ceramic metal composite motivated by the desire to improve the strength of the ceramic workpiece.

With regard to claim 46, none of the cited art discloses or suggests the thickness of the silicon bonding layer. Thus, the skilled artisan must rely on his own knowledge. It would be obvious to one of ordinary skill in the art to employ as little of the bonding layer as possible in order to reduce cost. Thus, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the silicon bonding layer with the thickness instantly claimed since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involved only routine skill in the art. *In re Aller*, 105 USPQ 233.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (703) 605-4426. The examiner can normally be reached on Tue-Fri, 8:30-6:00 and on alternating Mondays.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (703) 308-2414. The fax phone numbers for the organization where this application or proceeding is assigned are

Art Unit: 1771

(703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

HV
November 21, 2002


TERREL MORRIS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700